States of Jersey

Tidal Power for Jersey?
Options & Opportunities

Recommendations to the Minister for Planning and Environment from the Tidal Power Steering Group

15th December 2008

Contents

KEY CONCLUSIONS AND RECOMMENDATIONS

The Group are unanimous in believing that tidal power could, in the medium term, make a real and increasing contribution to the energy requirements and security of the Island for the rest of this century. They therefore have no hesitation in recommending that the possibility should be actively pursued.

Their key **conclusions** can be summarised as follows:

1. This is a long term project.
2. It would be preferable to make agreements with the other Channel Islands to exploit, on a collective basis, the tidal resources available to them all;
3. But that, in any case, Jersey should proceed with those partners who are willing to share the advantages and costs on an equitable basis;
4. When Jersey has a clear idea of how it wishes to take this forward, talks should be opened with EDF as a potentially valuable partner capable of taking surplus tidally generated power onto the French grid as part of the French commitment under the Kyoto Protocol to provide 20% of their national requirements from renewable resources;
5. Jersey could invite expressions of interest from potential commercial/industrial partners on the basis that the selected partner would pay for the initial studies to confirm that the tides around Jersey's shores are of sufficient strength and breadth to justify an investment. On this basis Jersey would have to expect that any partner proceeding to the exploitation phase would require a greater share of the profits having taken a greater share of the financial risk;
6. Alternatively Jersey could invest a sum of money in the order of £0.5 m to commission such first stage studies and thereby have control of the 'intellectual property' concerning the tides around Jersey. Such an investment would place Jersey in a more advantageous position at any subsequent negotiations;

The Group's overall **recommendation** is that the States should set up a qualified group with the mandate to move ahead with all deliberate speed to :

1. Commission the necessary research into the exploitability of the tides around Jersey including an environmental impact study;
2. Expend up to £0.5 m to pay for such studies;
3. Open talks with the other Channel Islands to see if there is willingness in principle to join in a collaborative effort to exploit tidal resources;
4. Open talks with EDF about possible future forms of partnership when the initial studies are complete;
5. Open talks with the relevant UK authorities.
6. Invite expressions of interest from private sector partners;
7. Produce a costed plan which indicates the investment needed and the rewards which could be expected, the timescale in which such rewards could be realised, and how such a scheme might compare with renewable energy generated from other sources.

The skills set and experience that the Group should include are, *inter alia*: commercial contract negotiation; legal and/or regulatory experience; international negotiation, understanding and knowledge of the renewable energy industry and of the energy system in Jersey and the Channel Isles more widely.

1.0 Introduction

There has been interest for many years in the feasibility of Jersey developing its renewable energy resources. Intuitively at least, windswept, sunny islands would seem to present ample opportunities for harnessing wind, tidal and solar power! High global oil prices and the recognition of the urgency of reducing carbon emissions to alleviate the effects of global climate change, serve to add impetus to the development of renewable energy. Our neighbouring Channel Islands have all made moves (to a greater or lesser degree) to position themselves in the marketplace and benefit from the harnessing of tidal current technology for the generation of electricity.

The Tidal Power Steering Group was set up at the request of the Minister for the Environment[i] with the broad remit of reporting on the potential contribution 'tidal power' might make to Jersey's energy requirements and the issues which might affect that. The potential for tidal power (among other forms of renewable energy) was explored in the Energy Policy Green Paper 'Fuel for thought?[ii]' as directed within the States of Jersey Strategic Plan 2006-2011 (Commitment Four, 4.3.2).

The task of the Group was to provide by the end of December 2008 a report for the Minister that sets out the following and makes recommendations, in respect of marine tidal energy :

- The scope for contributing to Jersey's energy requirements from waters under the control of the States of Jersey;
- The timescale for achieving this contribution;
- What potential obstacles such as permission from the Crown, planning controls and marine user objections exist, and how might they be overcome;
- The economic feasibility of harnessing energy from local waters;
- The funding mechanisms including possible strategic partnerships and access to external funding;
- Activities that could be undertaken in the short term on a "no regrets" basis;
- To explore the technology available to harness tidal power and the current readiness of this technology to deliver a tested solution

This report summarises the work of the Tidal Power Group from June to November 2008 and makes recommendations to the Minister on the way forward and the critical decisions and issues that must be addressed. At the end of each section a set of conclusions and recommendations are presented that build into the overall recommendations presented in Section 5 of the report.

Whilst the scope of the group restricted investigations to those surrounding tidal power, the conclusions and recommendations are strategic and propose a way forward that could easily apply to other forms of renewable energy development in the islands waters, such as wind power, if this were deemed suitable in the future.

1.1 The Members of the Tidal Power Group

The chairman would like to express his thanks to all the hard work put in by the members of the group who donated their time voluntarily.

The Members of the Tidal Power Steering Group are :

- **Constable Daniel Murphy** (Chairman);
- **Sir Nigel Broomfield** (Independent);
- **Deputy Rob Duhamel**;
- **Deputy Sean Power**;
- **Alick Macintosh** (Icecap Ltd, Carbon Trading);
- **David Padfield** (Jersey Electricity Company).

Officer support was from

- **Chris Newton** (Director for the Environment);
- **Dr. Louise Magris** (Assistant Director for Environmental Policy).

2.0 Background

2.1 Tidal Resources in the Channel Island's waters

A review of the potential renewable tidal energy sources was carried out in order to inform Jersey's Energy Policy Green Paper. The report outlines the following points many of which were confirmed and detailed to the group during their research:

1. Tidal flows (or streams) occur as a result of the regular and predictable ebbing and flowing of the sea, which can be accelerated by the local movement of water through channels and straits, into and out of bays and estuaries and dependent upon local seabed profiles. The combined currents and tidal streams are often referred to as marine currents when considering marine energy.

2. The potential power of a current is proportional to the cube of the current velocity but because tidal flows are typically of a low velocity (usually less than 6 knots or 3.1 metres per second (m/s)), tidal stream energy is of low power density despite the high density of water. As tidal streams are a diffuse form of energy, large numbers of energy devices need to be spread over relatively large areas of seabed, for a significant amount of energy generation. Because water is far denser than air, marine devices can be much smaller than wind turbines for the same power output, and operate at far lower velocities compared to typical wind turbines.

3. Tidal streams are steady and accurately predictable, although cyclical, giving marine current energy the potential for lower storage requirements and easier integration within network planning than say wind energy which is less predictable. The variation of tidal stream energy over the tidal cycle and throughout the season is very significant; the energy extractable over a neap tide may be less than one fifth of that from a spring tide

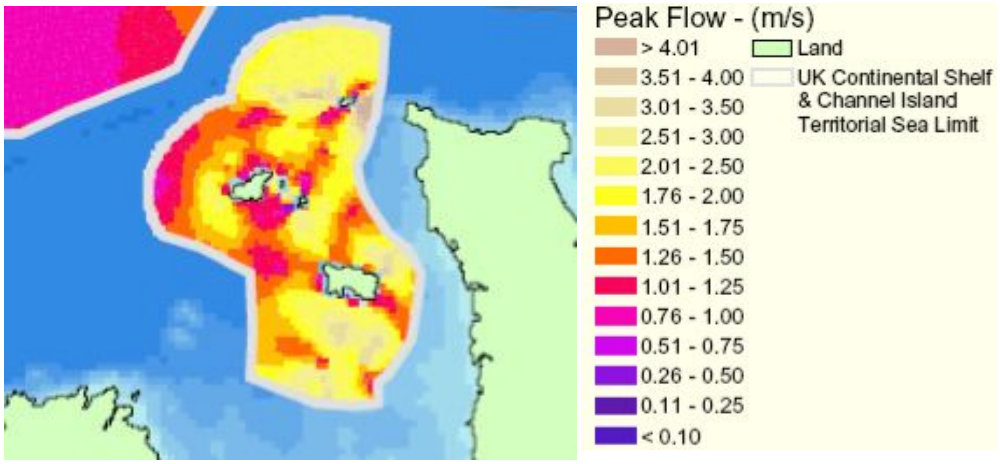
4. It is accepted that the sites of most interest for exploitation - that is, where exploitation is likely to be most economic - have a maximum current velocity in excess of 2.5 m/s.

5. Figure 1 shows the UK DTI mean spring tidal flow map which illustrates that in Jersey waters there is a range of tidal current speeds from 0-3.5 m/s with the area of the Le Ruau channel (to the north east of Jersey) as the area with the fastest tidal streams.

6. Jersey's waters represent a reasonable tidal resource although significantly lower than those tidal streams around Alderney, which reach over 5m/s. This led AEA to suggest that Jersey's waters are marginal for development but nevertheless *'in the longer term, when the technology is established and farms in the faster tidal current areas have been installed, developers may turn to areas of Jersey for tidal stream exploitation'*.

Figure 1 Peak flow for a mean spring tide

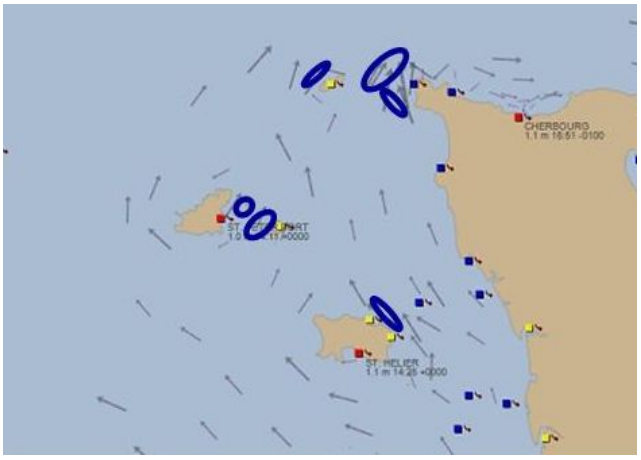
Extracted from DTI, (2004) Atlas of UK Marine Renewable Energy Resources[iii] (see also 'Jersey Natural Resources Study' carried out by AEA Energy and Environment for the States of Jersey)



The analysis carried out by AEA was further detailed by Marine Current Turbines (Figure 2) when their Technical Director met with the Tidal Power Steering Group (see Appendix 1)

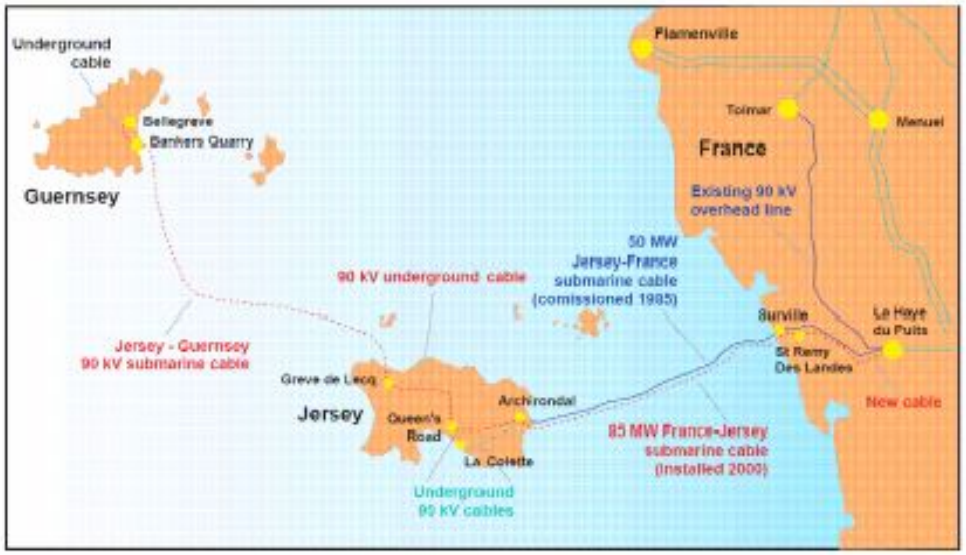
Figure 2 sites for tidal current energy sites

As identified by Marine Current Turbines (blue circles indicate potential sites)



Any harvesting of energy from tidal power will require the transmission of that electricity. The Channel Island Electricity Grid ("CIEG") is the transmission network that provides for the delivery of French electricity to Jersey and onwards to Guernsey (Figure 3). The JEC owns and maintains the distribution infrastructure for electricity both on-Island and from the Continent via the two existing interconnectors. The Jersey-Guernsey interconnector is bidirectional whilst the two Jersey to France connectors are uni-directional, but could be easily modified at low cost to be bi-directional. A third interconnector is planned between Jersey and France in 2012 which is planned currently to be omni-directional. However, depending on additional agreement with RTE (the operators of the French grid), it is relatively simple and low-cost to make the new inter-connector bi-directional.

Figure 3 Interconnector Routes and Capacity of the Channel Islands Electricity grid
Source JEC 2006



2.1a CONCLUSIONS

1. Jersey's waters have potentially good tidal current resources and neighbouring waters have extremely good tidal current resources; far in excess of Channel Island electricity requirements and even surpass total energy demands. This presents opportunities to:

- *Sell surplus peak power to a large conventional supplier i.e. EDF or a British utility;*
- *Sell all electricity into a major utility in exchange for constant power to Jersey*
- *Store power for other uses for example in electric vehicles. Currently there is no utility scale electricity storage technology that is economically viable, although this is likely to change over the next decade with the development of new technologies such as hydrogen fuel cells.*

2. Tidal current resources are predictable but intermittent thus requiring the need for other energy sources to maintain continuity of supply at all times.

3. The assumed locations of potential sites in Jersey waters need to be verified by more detailed studies to show that the resource can justify the deployment of devices.

4. Jersey is in a strong position with interconnectors to Guernsey and the French mainland. The Jersey Electricity Company (through the 'Channel Island Electricity Grid') has extensive experience in electricity transmission between Jersey, Guernsey and the Continent.

2.1b RECOMMENDATIONS

1. Jersey should explore the potential for developing the tidal power resource. This resource could make a significant contribution to energy supply for Jersey within 10 to 15 years.

2. A policy of 'waiting for developers' might appear superficially attractive but is not recommended. The disadvantage is that others, including neighbouring Channel Isles, would probably go ahead. Jersey would miss out on the most attractive partnerships and miss out on most of the investment.

2.2 Tidal Current Technologies

It is beyond the scope of this document to detail fully the status of the individual technologies and devices under development. The Tidal Power Group quickly concluded that it was not their role to recommend one particular technology over another. 'Picking winners' at this stage was not within the Group's remit and it was concluded that, should Jersey reach a position in the future when the Island or its representatives are considering devices, the marketplace is likely to be very different than today. Nevertheless the following paragraphs present a very brief contextual overview of the status of the industry and other pertinent points.

Tidal stream technology is still an emerging technology. There are many device developers and types of device in the market place. Devices can be installed by a number of different means and can be either wholly sub-surface or surface-piercing but still fixed to the seabed. Clearly the sea-bed substrate and the depth of water column (75% of the Energy is in the upper 50% of the water column) dictate what device is appropriate for a particular site.

Few devices have gone beyond the 'proof of concept' stage although the Seagen project Marine Current Turbine Ltd., was deployed in Strangford Narrows off Northern Ireland in May 2008 with the intention of generating 1.2 MW. It is understood this firm with its partners is preparing to move to the next stage and produce an array of sub-sea generators capable of producing 5MW by 2010. To put this in perspective, Jersey's peak electricity demand is 157MW.

2.2a CONCLUSIONS

1. Jersey has sufficient tidal resource to attract research and development in its waters especially if this were in conjunction with neighbouring Islands.

2. Tidal Current technology is a fast evolving industry. Technology and device providers are likely to develop and consolidate rapidly until equilibrium is reached in the marketplace, as has been observed over the last two decades in the wind generation industry.

2.2b RECOMMENDATIONS

1. At this stage, if Jersey decides to take forward investigations into harnessing marine current energy, it should be concerned with ensuring that the Island has the correct enabling framework to attract device developers to harvest the tidal resource in our waters. When this framework is in place, attention can then be turned to the market place and device developers.

3.0 The development of tidal power in neighbouring jurisdictions

The following arrangements are in place in the neighbouring Channel Islands and the group has explored the detail of many of them via meetings and discussions with the relevant authorities (see Appendix 1).

3.1 Alderney

Alderney's territorial waters have one of the largest exploitable tidal resources estimated at up to 3Gigawatts (GW), and is the most advanced of the Channel Islands having already legislated to regulate the development of the tidal power resource. In 2005, the Alderney Commission for Renewable Energy (ACRE[iv]) was formed and works to regulate the development of renewable

energy on behalf of the States of Alderney. The Commission consists of a chairman and three members with expertise in business, power generation, oceanography and legal backgrounds and is also advised by a range of international consultants. Critically, ACRE needed to ensure the correct legislation was in place to be able to regulate the harvesting of the resource and in July 2008, the Renewable Energy (Alderney) Law, 2007 received Royal Assent.

ACRE have exclusively licensed one entity, Alderney Renewable Energy Ltd[v] (ARE), for 5 years to research, survey and test marine renewable devices for the purpose of electricity generation. The enabling studies that ARE is undertaking include:

- An Environmental Impact Assessment (EIA);
- Oceanographic studies;
- Tidal flow modelling.

The situation in Aldernery has moved rapidly since September 2008. ARE are acting in a manner similar to a 'broker' between government and the technology developers, state[vi] the following as the current situation:

- ARE has now been issued with a licence to exclusively develop 50% of Alderney's territorial waters. This licence is valid for a minimum period of 65 years.
- ARE has secured export capacity to the Cotentin peninsular of 285MW. This has been secured by way of a deposit paid to RTE as part of the PTF process.
- ARE is currently working with Price Water House Coopers to ascertain the most appropriate partner with whom to commercially develop the 50% of Alderney's territorial waters. ARE has been in discussions with potential partners such as EDF, International Power and Scottish & Southern (through Airtricity).
- ARE has worked successfully as a resource developer to establish the correct legal and financial regime which potential developers will find attractive.
- It should be pointed out that any technology used in the development of Alderney's territorial waters is the choice of Alderney Renewable Energy, not the Alderney Commission for Renewable Energy, the function of ACRE is to approve the choices made by ARE.
- ARE has recently completed a significant round of fundraising. It is potentially fully funded for the next 5 years and should not need to return to the market for this period.

The revenue for the States of Alderney for the harvesting of the resource is through royalty and 'rental' of the sea bed.

3.2 Sark

Sark has also recognised the potential to develop tidal power in their territorial waters. The sea bed in Sark's waters belongs to the Crown and the Island is presently preparing legislation that will regulate commercial activities such as harvesting tidal power. The legislation is being progressed to follow that of Alderney's very closely.

In May 2008, the General Purposes and Advisory Committee (A Committee of the Chief Pleas of Sark) issued a Request for Proposals[vii] with the aim of developing a plan to harvest power from tidal movement within Sark's territorial waters. The intention is to identify a project manager for harvesting tidal power for Sark and Roger Olsen (Chair, General Purposes & Advisory Committee) confirmed that as of the beginning of October 2008 the Committee are assessing proposals and

hope to agree a "first choice candidate" by November. When the candidate is identified it is understood that general terms are likely to include a timeline or a range of steps to be taken on the way to establishing tidal power for Sark. Critical commercial issues to be resolved include the coordination with neighbouring islands for transmission to a major consumer.

Alderney Renewable Energy founded Sark Renewable Energy in collaboration with Airtricity (part of the Scottish and Southern Energy Group) in 2008 and responded to Sark's Request for Proposals along with several other consortia and device developers.

3.3 Guernsey

The Guernsey Energy Policy was adopted by the States of Guernsey[viii] in June 2008 and *inter alia* the States are recommended to:

Focus their interests in renewable energy on:-

(a) preparing the necessary legislation which will enable Guernsey to take advantage of tidal power opportunities as and when they arise;
(b) closely monitoring tidal power technologies and opportunities;
(c) encouraging, promoting and facilitating tidal power opportunities; and
(d) directing the Commerce and Employment Department to establish a Guernsey Renewable Energy Commission responsible for promoting and licensing macro-renewable energy projects within Guernsey;

The Policy is clear in that it does not propose direct investment into a tidal energy scheme from States general revenues but instead recommends that the necessary legislation is in place that will allow investment in such initiatives to take place. Such legislation will clarify the responsibilities involved in establishing a tidal energy project, especially in regard to contracts and licensing of the sea floor. The funding of any such projects will be a matter for the Guernsey Renewable Energy Commission to consider. The Guernsey Renewable Energy Commission was established in September 2008[ix] and will be operating as a shadow commission until the appropriate legislation is in place. Guernsey Electricity (the wholly Government-owned sole electricity utility in Guernsey) are undertaking a hydrographic survey of Bailiwick waters, covering the area between Herm and Sark and South of Sark.

3.4 France

European Union leaders have undertaken by 2020 to provide 20% of their power from renewable resources. A directive is under discussion in the EU which would permit Member States to import renewable energy from outside the EU to count towards their 20% commitments.

Although French renewable generation is already relatively advanced with significant hydro and onshore wind installations, attention has been turned to marine renewables. EdF, the French energy supplier with whom the Jersey Electricity Company holds a contract to purchase electricity until 2012, announced in August 2008[x] that it has decided to build the first pilot tidal turbine system in France in order to produce renewably-generated electricity. The intention is that by 2011 between three and six turbines, with a total capacity of between 4 and 6 MW, will be installed and linked to the grid off Paimpol (Côtes d'Armor, Brittany), where strong currents exist.

3.5 The United Kingdom

Like France, under the terms of the Kyoto Protocol, the UK has a target of 20% of their power generation being from renewable resources. The UK is actively investigating several tidal energy sites in British waters[xi] as the Crown Office opened parts of the seabed for leasing to developers. Three potential sites are under investigation by ScottishPower with ambitious plans reported for up to 60 underwater turbines, generating 60 mega watts of power for 40,000 homes. Possible sites are in the Pentland Firth between the Scottish mainland and Orkney, in the Sound of Islay and off the coast of Country Antrim, Northern Ireland. Pilot schemes have also been undertaken in Lynmouth in Devon (Marine Current Turbines, Sea Flow, proof of concept project) and the European Marine Energy Centre Ltd (EMEC)[xii] in Stromness in Ornkey was established to help the evolution of marine energy devices from the prototype stage into the commercial market place. EMEC Ltd offers the opportunity to test full scale prototype devices and provides connections to the National Grid via seabed cables running from open-water test berths.

3.0a CONCLUSIONS

1. Jersey's Channel Island neighbours, France and the UK are all making progress towards an aim of harnessing tidal current energy.

2. Discussions with the other Channel Islands have shown that the respective Governments do not feel it appropriate that public money is invested into building and operating tidal schemes. The reasons for this include the large sums of money involved and the risks surrounding such nascent technology. Instead the common model has been to create a regulatory body (a 'commission') that acts as the broker between government and a third party, be that a resource developer (as in the case of ARE in Alderney) or perhaps even a technology provider as could be the case in Sark depending on the outcome of the request for proposals.

3.0a RECOMMENDATIONS

1. If Jersey intends to develop tidal power there is nothing to be gained by waiting, indeed the risk is that the Island could be left behind its neighbours missing opportunities for collaboration. Jersey should take action to catch up with developments in other countries. In doing so it can take advantage of the progress made in other jurisdictions.

2. The potential market for surplus renewable power generated by either Jersey or a consortium of Channel Islands in the UK France should be explored.

3. Jersey should set up the appropriate legal and regulatory framework to enable the harnessing and marketing of the potential tidal resource.

4.0 Steps to making tidal power a reality in Jersey's waters

The group have identified a number of key areas for action and its recommendations are outlined in Section 5 – Conclusions and Recommendations

4.1 Key areas for Action

There are a number of key areas for action :

- Progress the Regulatory Regime and Legislation framework
- Initiate the investigations to assess the Environmental Impact and available tidal resources
- Examine funding options
- Examine partnership options

4.2 Model for implementation

The States of Jersey must define what level of risk and reward it is prepared to accept and construct the appropriate regime to deliver this. Other Channel Island have adopted a low-risk position via a 'Commission-based' model whereby the Commission promotes and licences the projects but does not invest any public money in operational projects. The Commission acts at arms-length to Government.

Advantages to this approach include the creation of a dedicated body that can:

- Manage the appropriate regulatory regime;
- Explore and consult on critical initial decisions, for instance the Alderney States instructed that surface piercing technologies would not be acceptable thus clearly setting the agenda.
- Examine the market place and liaise with resource developers and technology providers;
- At the point of deployment, a technology developer can liaise with a body that can respond in commercial timescales. For example in the Alderney model, the Commission makes politically independent decisions and thus is able to respond swiftly.

Disadvantages to this approach

- The cost of creating and running the body (through a States Department – most likely Economic Development) as well as the commitment of suitably qualified individuals that may be asked to volunteer their time.

4.3 Regulation and Legislation

The legislative framework for the harnessing and licensing of the resource must be constructed and implemented.

Ownership of the seabed

The group established that there are no major legal obstacles to the States of Jersey exploiting marine energy around its coast. Whilst the tidal resource itself i.e. the water up to the 12 mile limit of the territorial waters, is within Jersey's jurisdiction, devices would need to be attached to the seabed which initial investigations suggests is owned by the Crown Estate. Thus on clarification of the issue, it is likely that Jersey will need to negotiate with the Crown Estate to lease the appropriate part of the sea bed.

Legislation to regulate the harvesting of tidal power

Legislation must be put in place to regulate the harvesting of the resource. Law drafting time will need to be secured and legislation bought before the States Assembly for agreement.

A consenting regime

A 'fit for purpose' consenting regime is important to attract inward investment. If Jersey can create simple and streamlined regulations and processes which can respond in commercially acceptable timescales this would create a commercial advantage.

4.4 Environmental considerations and resource mapping

The Environmental Impact Assessment Process

The potential environmental impact of any device installations and any possible mitigation measures must be assessed and planned for to ensure that any projects would be environmentally benign and of no consequence to other maritime stakeholders e.g. the fisheries industry. The process for this is an Environmental Impact Assessment (EIA) which will require extensive studies to define the baseline conditions. The timescales for the EIA process must not be underestimated; in Alderney these studies took 2 years and it was critical for this to be carried out as an open transparent process in partnership with all stakeholders

Tidal Resource Mapping

Whilst the available tidal resource is understood at the high level, detailed bathymetric and hydrographic studies are required to evaluate the best resources and sites. The group were given a figure of around £0.5 m for studies off the North East coast of Jersey to establish in sufficient detail whether the tidal flows there might generate sufficient power to make it worthwhile considering taking the project further.

4.5 Funding mechanisms

In many other jurisdictions progress towards developing renewable energy is driven by being a signatory to the Kyoto Protocol. The Kyoto Protocol is an international agreement setting targets for industrialised countries to cut their greenhouse gas emissions. Industrialised countries have committed to cut their combined emissions to 5% below 1990 levels by 2008 - 2012. Jersey is a signatory to the Kyoto Convention[xiii] through the UK but the Island does not have an individual 'allocated allowance' meaning that Jersey's carbon emissions are counted among those of the UK rather than separately.

Currently renewable energy is more expensive to produce than conventional hydrocarbon derived energy and is supported in the form of subsidy to incentivise investment in renewable energy generation and make projects economically viable. The position of Jersey in respect of these subsidies is not clear and it is critical to begin negotiations with the relevant bodies to establish in what circumstances a Jersey project might benefit.

Renewable Obligation Certificates

Renewable Obligation Certificates (ROCs – See Appendix 2) could be available to energy generated in Channel Island Waters but exported to France or the UK. Currently it is believed that ROCs are worth c.£51 per kWh of electricity which significantly enhances the economic viability of a potential project.

Joint Initiative Projects

Joint Initiative projects (JI - See Appendix 2) are Kyoto "project based mechanisms" which involve the development and implementation of projects that reduce greenhouse gas emissions. These generate carbon credits that can be sold on the carbon market (International emissions trading involve trading in emissions reduction or carbon credits). These so-called "climate change projects" not only reduce GHG emissions, they can also generate an additional income stream for the project in the form of 'carbon credits' again enhancing the economic viability of a potential project. The future of JI projects is currently under discussion and the UK government has put a moratorium on all UK based JI projects for the foreseeable future although there is potential that future decisions may mean a tidal power project in Jersey's waters would receive support.

Marine Renewables Deployment Fund (MRDF)

In August 2004 the Secretary of State for Trade and Industry established the Marine Renewables Deployment Fund (MRDF[xiv]) with a budget of £50M which now sits within the Department for Business Enterprise and Reform (BERR[xv]). The MRDF has four components, the Wave and Tidal-stream Energy Demonstration Scheme, environmental research, related research and infrastructure support. The Wave and Tidal-stream Energy Demonstration Scheme provides capital grants and revenue support to multi-device early stage commercial generation facilities using technologies that have completed their R&D and are ready to move into a commercial environment. Again the availability of such grant funding to Jersey is unclear and should be investigated further.

The group believe that the level of financial reward from any project in Jersey waters in at least the short to medium term should not be overestimated. Even modest returns are not expected for many years and public expectations should be managed accordingly – Such a project could not bring 'free electricity' to all Islanders.

4.6 Collaborations

The Group considers it important to involve a range of private providers in any discussions, and indeed in the development of any scheme to exploit tidal power around Jersey. These firms are likely to be more knowledgeable about the potential power to be generated and could participate, on the basis of licences, in the provision of investment capital to launch any project.

It would, however, be essential that the terms and conditions of any such partnerships should be carefully negotiated and regulated by the States through the implementation body.

The Group also considered that, a decision to exploit tidal power, could have a beneficial effect on any carbon trading market that might be established in Jersey in the future. An important element in the establishment of such a market would, in the minds of the traders, be Jersey's own attitude to global warming and environmental protection. Tide generated power would be a powerful statement of such an attitude.

Jersey is in an advantageous position since the Jersey Electricity Company (JEC) holds the electricity infrastructure gateway to the Continent and has long-term experience of inter-jurisdictional working through the Channel Island Electricity Grid. The JEC also has a strong cable network on the island which would easily facilitate the connection of marine generators, and may offer advantages over other jurisdictions where connections to the grid would be difficult and/or expensive. It seems that whatever implementation model was adopted, the JEC would be a key partner in the establishment of tidal power in the Island.

Jersey Marine Renewable Energy Ltd (JMRE) was founded in 2008 by the directors of ARE with the intention of mirroring their role in Alderney as a resource developer. Discussions between the Group and JMRE (See Appendix 1) concluded that JMRE are keen to work with the Jersey States in whatever implementation model was decided upon and would wish to submit an application if a request for proposals was issued. They also indicated they would be keen to involve the JEC into any such collaboration.

The Group considered that while 'going it alone' might turn out to be the correct course it should only be adopted if it could be shown that partnerships were less efficient and more expensive. There are likely to be advantages to working in cross-island collaborations including economies of scale even if each jurisdiction were to choose different resource developers and maintain independent control of their own resource. A particular advantage of the islands working together would be the pooling of power generated across the islands. This would provide a more significant quantity of power for sale into the Continental or UK markets thus putting the islands in a stronger negotiating position than that of four separate and competing jurisdictions. It is therefore important to conduct a properly prepared round of discussions with potential partners both public and private to establish what options might be available.

5.0 Conclusions & Recommendations

As a result of a unique set of circumstances (global warming and an increasing price trend for carbon fuels) Jersey may have an opportunity to exploit, for the benefit of all its inhabitants, one of its greatest natural assets – the tides around its shores. If brought to a successful conclusion this could have a lasting effect on life in the Island and enhance Jersey's international reputation as an environmentally responsible jurisdiction.

The Group considered a range of options including the following:

- To dismiss the idea of commercially viable tidal power as impractical and concentrate on other forms of non-carbon energy.
- To hold back for the time being until the technology was better developed and to enter the market only when it was clear that the costs of generating tidal energy was equivalent to other forms of renewable energy;
- To commit some resources to studying whether there is the potential to make tidal power a useful and cost effective contribution to Jersey's energy mix;
- To do further research to establish if partnerships, for example with the other Channel Islands, France (including EDF) or the UK, in developing tidal power would be beneficial to Jersey;

5.1 Conclusions

The Group are unanimous in believing that tidal power could, in the medium term, make a real and increasing contribution to the energy requirements and security of the Island for the rest of this century. They therefore have no hesitation in recommending that the possibility should be actively pursued.

Their key conclusions can be summarised as follows:

1. This is a long term project. It may take up to 10 years to realise but could play a progressively more important role in energy security, carbon reduction and commercial benefit to the Island.

2. It would be preferable to make agreements with the other Channel Islands to exploit, on a collective basis, the resources available to them all;

3. But this might be a time consuming task and Jersey should proceed with those partners who were willing to share the advantages and costs on an equitable basis;

4. When Jersey has a clear idea of how it wishes to go forward, talks should be opened with EDF as a potentially valuable partner capable of taking surplus tidally generated power onto the French grid as part of the French commitment under the Kyoto Protocol to provide 20% of their national requirements from renewable resources;

5. Talks should also take place with the relevant UK authorities;

6. Jersey could invite expressions of interest from potential commercial/industrial partners on the basis that the selected partner would pay for the initial studies to confirm that the tides around Jersey's north-east shore are of sufficient strength and breadth to justify an investment. On this basis Jersey would have to expect that any partner proceeding to the exploitation phase would require a greater share of the profits having taken a greater share of the financial risk;

7. Alternatively Jersey could invest a sum of money not greater than £0.5 m to commission such first stage studies and thereby have control of the 'intellectual property' concerning the tides around Jersey. Such an investment would place Jersey in a more advantageous position at any subsequent negotiations;

5.2 Recommendations

The Group's overall **recommendation** is that the States should set up a qualified committee with the mandate to move ahead with all deliberate speed to:

1. Commission the necessary research into the exploitability of the tides around Jersey including an environmental impact study;

2. Expend up to £0.5 m to pay for such studies;

3. Clarify the legal position on the ownership of the seabed;

4. Prepare and recommend the appropriate regulatory regime;

5. Open talks with the other Channel Islands to see if there is willingness in principle to join in a collaborative effort to exploit tidal resources;

6. Open talks with EDF about possible future forms of partnership when the initial studies are complete;

7. Open talks with the relevant UK authorities;

8. Invite expressions of interest from private sector partners;

9. Produce a costed plan which indicates the investment needed and the rewards which could be expected and how such a scheme might compare with renewable energy generated from other sources and how it might fit with the Island's overall energy needs in the years ahead.

The skills set and experience that the Group should include are, inter alia: commercial contract negotiation; legal and/or regulatory experience; international negotiation, understanding and knowledge of the renewable energy industry and of the energy system in Jersey and the Channel Isles more widely.

Appendix 1 – Visits and discussions

The Tidal Power Group met on the following occasions

- 30th June 2008 - Members meeting
- 8th August 2008 – Peter Frankel in attendance (see below)
- 1st September 2008 - Mike Liston in attendance, see below
- 26th September 2008 - Presentation from ARE (see below)
- 14th October 2008 – Mike King, CEO Economic Development Department in attendance
- 9th December – Members meeting

08/08/08 - Presentation by Dr Peter Frankel, Technical Director Marine Current Turbines (http://www.marineturbines.com) to Tidal power Steering Group

21/08/08 - Meeting of Constable Murphy with Senator Legrand (President of Conseil General de la Manche) in Normandy also attending: Thierry Motte (Cabinet Representative for International relations); Aurelie Leroy (Normandy representative in Jersey and Seamus Canavan (Jersey's representative in Normandy)

28/08/08 - Visit by Constable Murphy and Louise Magris to Guernsey to meet: the Minister for Commerce and Employment, Carla Mc Nulty Bauer; Jon Buckland, Chief Officer Commerce and Employment Department and Jon Torode, Senior Sea Fisheries Officer, Commerce and Employment Department

01/09/08 – Telephone conversation between Constable Murphy and Roger Olsen, President General Purposes and Advisory Committee, Sark. Followed up by further emails and discussion with Roger Olsen and Richard Dewe, the Vice Chair.

01/09/08 – Mike Liston attending Tidal Power Steering Group to update the group on the formation of Jersey Marine Renewable Energy Ltd. (JMRE ltd.)

26/09/08 – Meeting of Tidal Power Group with Stuart Trought, CEO, Alderney Renewable Energy Ltd and of Jersey Marine Renewable Energy Ltd (JMRE); Mark Wordsworth - Director of ARE (formerly Chairman of the Alderney Commission for Renewable energy); Mike Lison – retiring CEO of JEC and Director of Jersey Marine Renewable Energy Ltd ; Christopher Ambler – CEO JEC

Appendix 2 – Renewable Obligation Certificates (ROCs) and Joint Initiative (JI)

The Renewables Obligation and Renewable Obligation Certificates

The Renewables Obligation (RO) incentivises the generation of electricity from eligible renewable sources in the United Kingdom by placing an obligation on electricity supplies to provide an increasing proportion of energy from approved renewable sources. Renewable Obligation Certificates (ROCs) are the green certificates issued by Ofgem to accredited renewable generators, for eligible renewable electricity generated and supplied to customers in the United Kingdom by a licensed supplier. Suppliers meet their obligations by presenting ROCs and where suppliers do not have sufficient ROCs to cover their obligation, they must make a payment into the buy-out fund. The buy-out price is a fixed price per MWh shortfall and is adjusted in line with the Retail Price Index each year. The proceeds of the buy-out fund are paid back to suppliers in proportion to how many ROCs they have presented.

Joint Initiative projects

"The JI is one of the flexible mechanisms of the Kyoto Protocol (the other being the Clean Development Mechanism) and is defined in Article 6 of the protocol. Annex 1 parties to the United Nations Framework Convention on Climate Change (i.e. those countries with emission reduction targets to meet by 2012) may sell Emissions Reductions Units (ERUs) generated from a JI project. Both JI and CDM are "project based mechanisms" collectively known as "climate change projects". They involve developing and implementing projects that reduce GHG emissions overseas, thereby generating carbon credits that can be sold on the carbon market. This means that a project that reduces GHG emissions can generate an additional income stream in the form of carbon credits. ERUs from JI projects are issued by the governments of Annex 1 countries and each ERU is therefore backed by an equivalent Assigned Amount Unit (AAU), the unit of compliance with targets under the Kyoto Protocol."

Under this definition the tidal project is undeniably a JI project, however, the UK government has put a moratorium on all UK based JI projects for the foreseeable future. Their reasoning for this stance is that the UK is going to struggle to meet their Kyoto target and therefore will be "short" of carbon credits and as a JI project is by definition backed by governmental credits (AAUs) then any approval of a JI project will exacerbate the short position.

The Group believe that there is however, some potential as the Conservatives have indicated to the International Emissions Trading Association that they would encourage the use of JI projects in certain circumstances and the group believe that a tidal power project in Jersey waters may be seen an as attractive project.

Endnotes

[i] http://www.gov.je/StatesGreffe/MinisterialDecision/PlanningEnvironment/2008/tidalpowergroup.htm
[ii] http://www.gov.je/PlanningEnvironment/Environment/From+global+to+local+policy/Energy+Policy+Green+Paper+Launched.htm
[iii] http://www.dti.gov.uk/energy/renewables/technologies/atlastechnicalreport.shtml
[iv] http://www.acre.gov.gg/index.php
[v] http://www.are.gb.com/
[vi] Email from S. Trought CEO of Alderney Renewable Energy to L. Magris 04/12/08
[vii] http://www.sark.info/downloads/government/tidalpower/tidalpowerforsark.pdf
[viii] Billet D'Etat VIII June 2008
[ix] http://www.gov.gg/ccm/commerce-and-employment/press-releases/2008/shadow-members-appointed-for-guernsey-renewable-energy-commission.en
[x] http://www.edf.fr/the-edf-group/press/press-releases/noeud-communiques-et-dossier-de-presse/edf-to-develop-tidal-power-600276.html
[xi] http://news.uk.msn.com/Article.aspx?cp-documentid=9824009
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